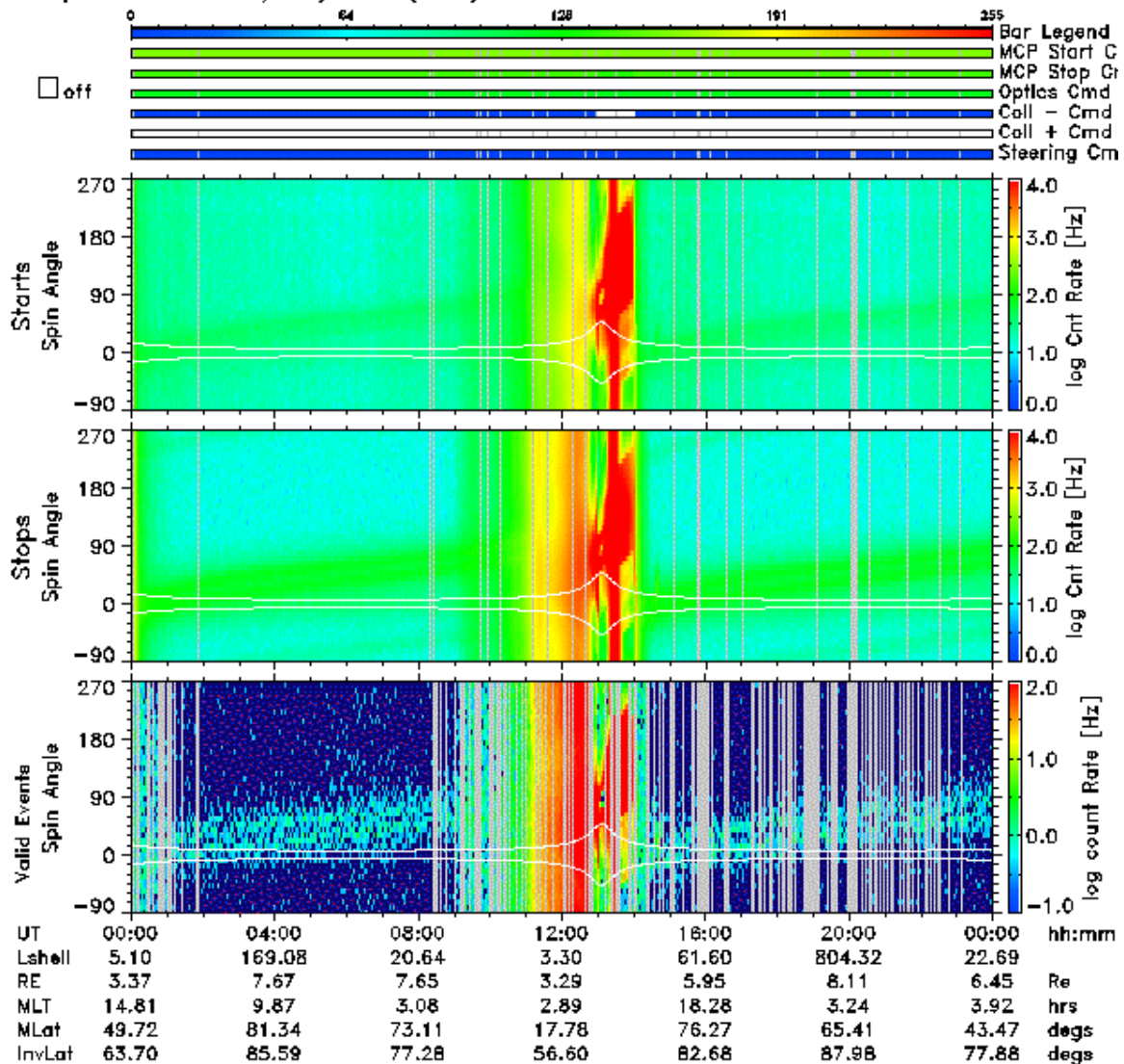


Direct Observations of Interstellar Neutral Atoms

David Simpson/GSFC

IMAGE/LENA Singles & Coincidences
 Start Time: 2001/01/20 (20) 00:00:00
 Stop Time: 2001/01/20 (20) 23:59:59



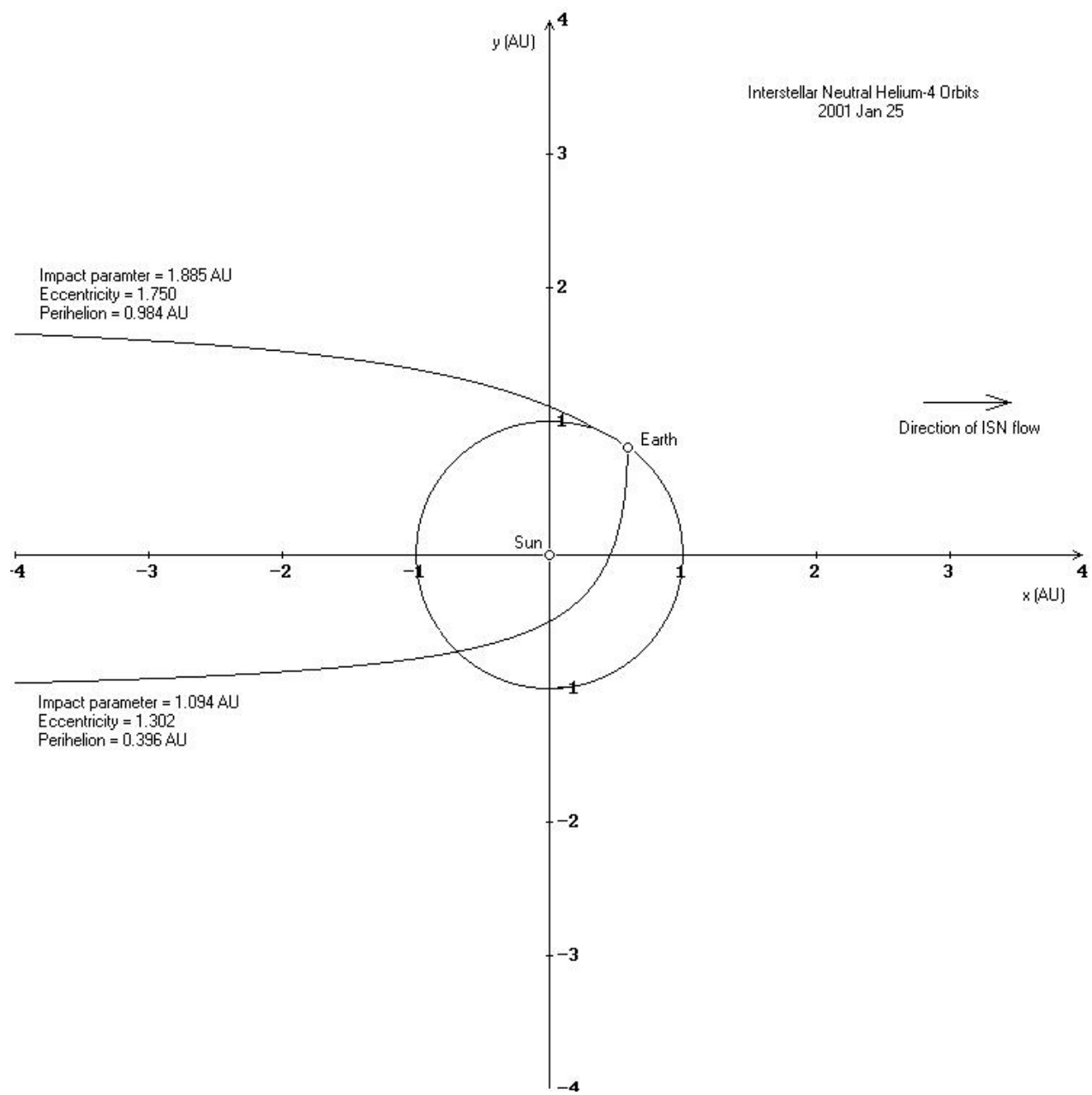
TOF Start CFD Level: 11
 HVPS Optics Steering Cmd: 0
 lena_dps_v1.0.0
 Wed Apr 11 03:41:38 2001
 Data: UDF Definitive
 zero spin angle: Earth

TOF Stop CFD Level: 6
 HVPS MCP Stop VMON: 167*

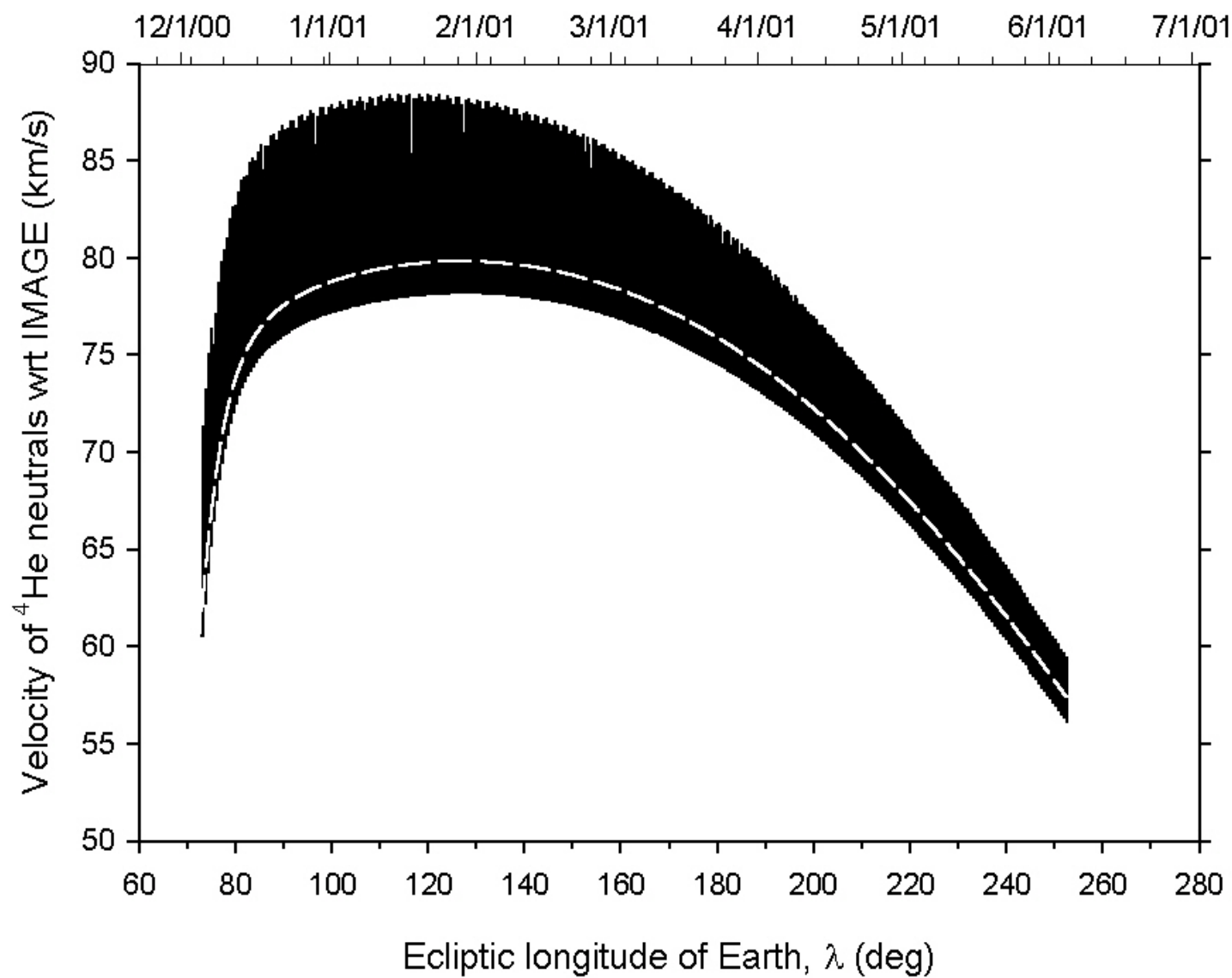
/archive1/PRODUCTS/downloads/I01012000002359_sumsp0.glf

Overview

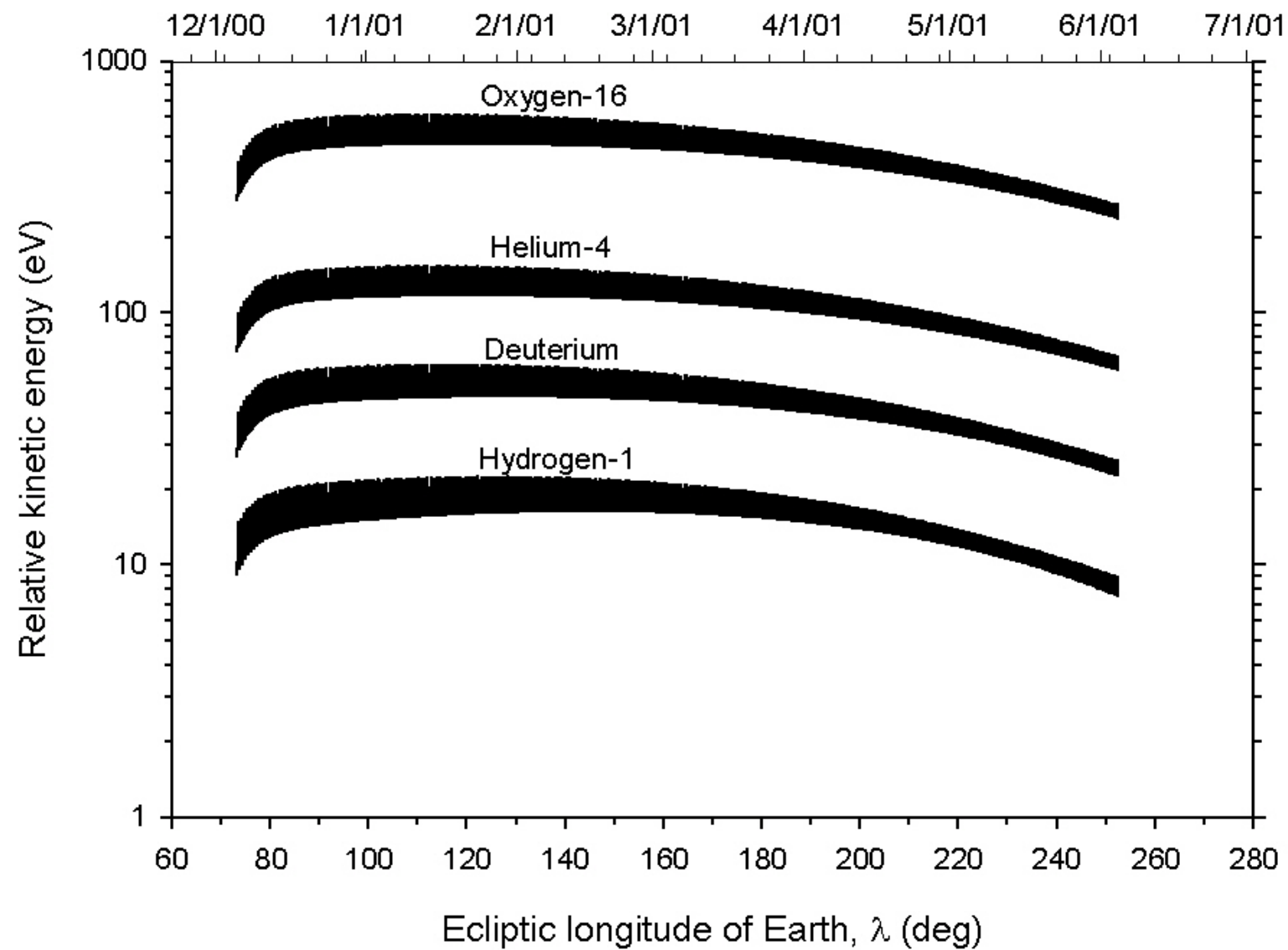
- The appearance of a low-energy interstellar neutral atom signal in the LENA data had been predicted by S. Fuselier
- Hyperbolic orbits of interstellar neutral atoms around the Sun have been calculated in three dimensions
- Velocity vectors of neutrals with respect to IMAGE have been calculated, allowing for motion of the Earth and spacecraft, solar gravitation and deflection, and radiation pressure
- Calculated orbits have been used to predict the expected location of an interstellar neutral atom signal in the LENA data



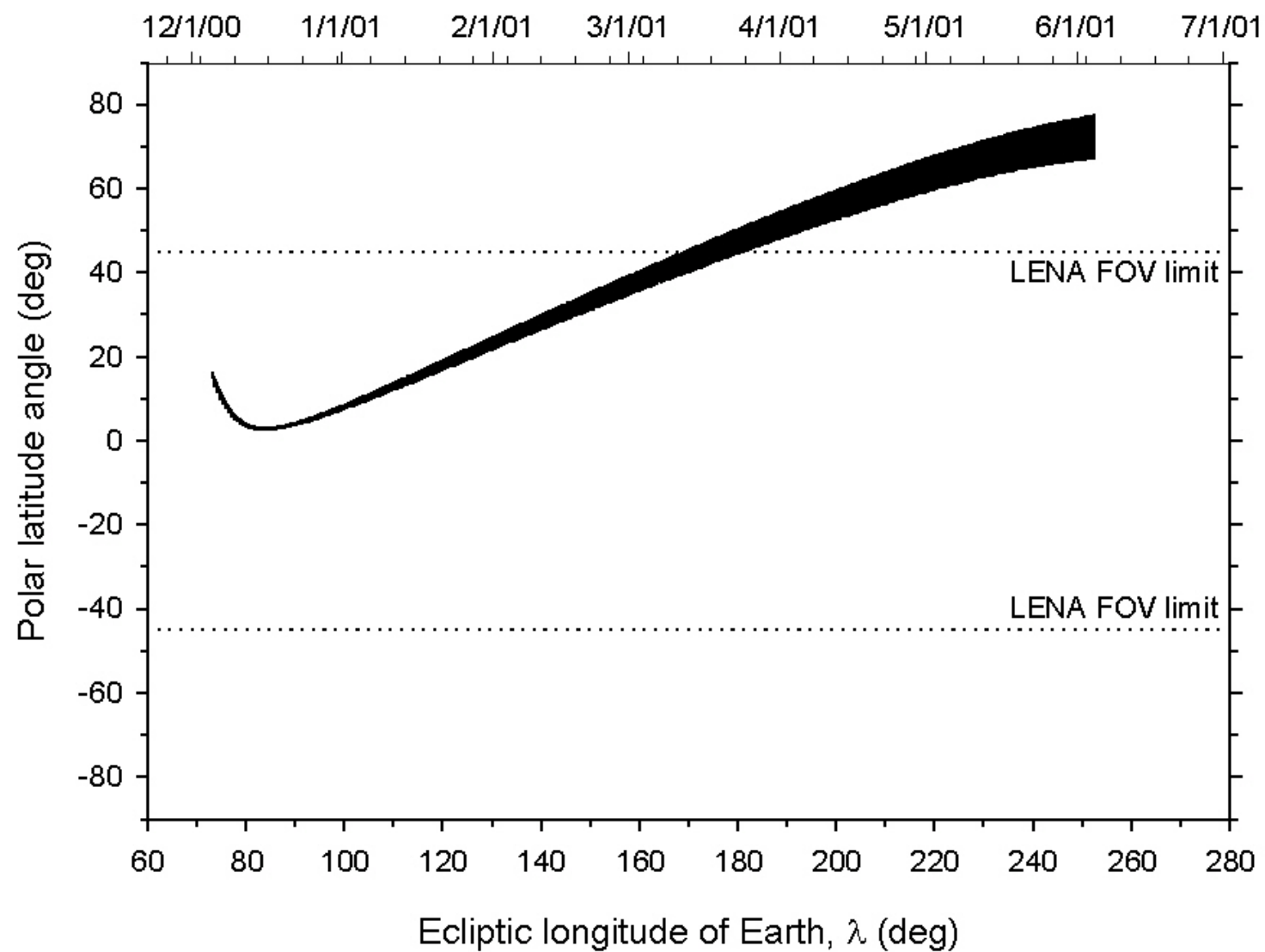
Velocity of ^4He neutral atoms wrt IMAGE along Earth orbit ($v_0=20$ km/s)



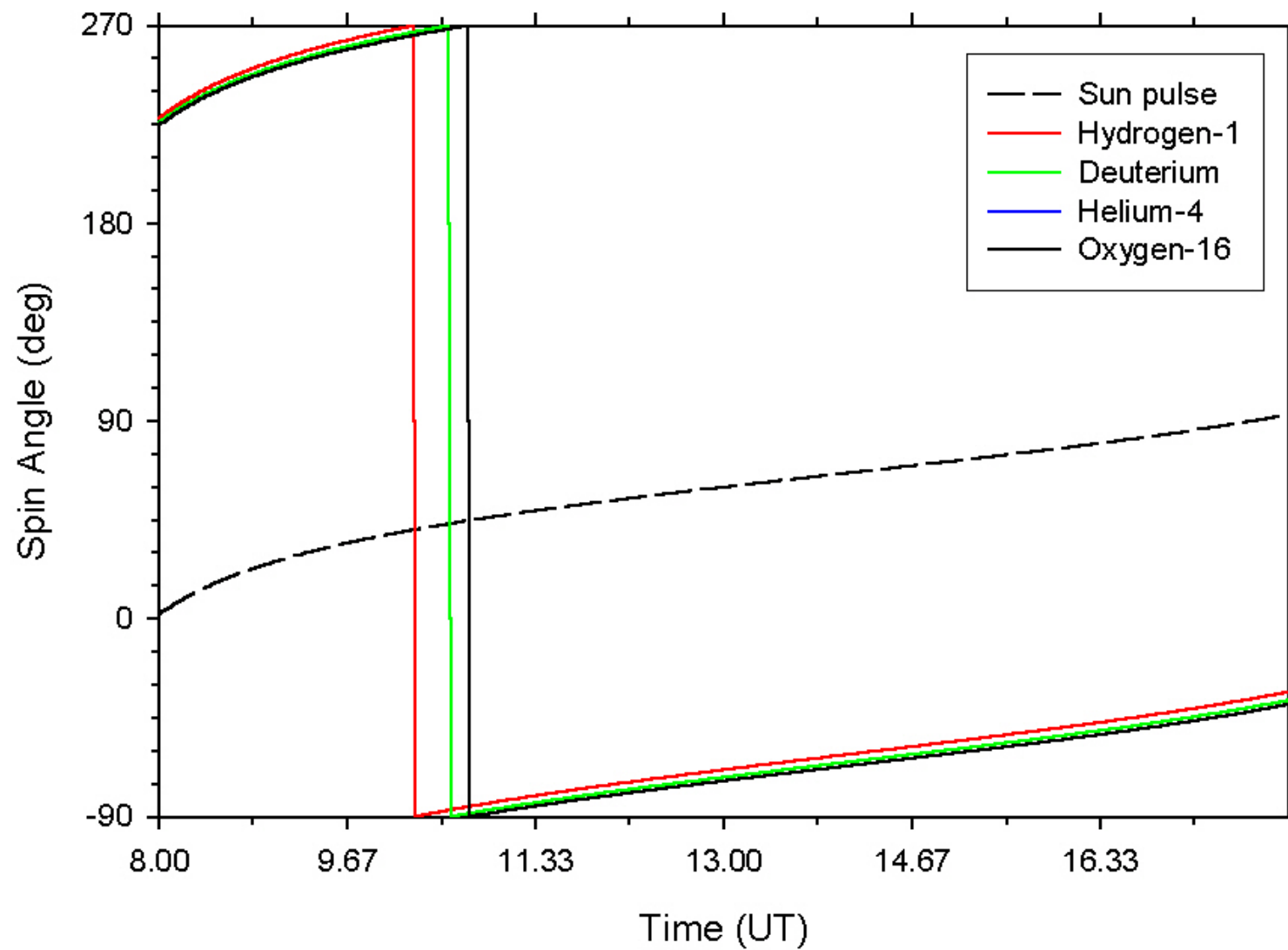
Relative kinetic energy vs. Earth angle ($v_0=20$ km/s)



ISN ^4He polar latitude angle along Earth orbit ($v_0=20$ km/s)



Predicted ISN signal, 2001 Jan 25 ($v_0=20$ km/s)



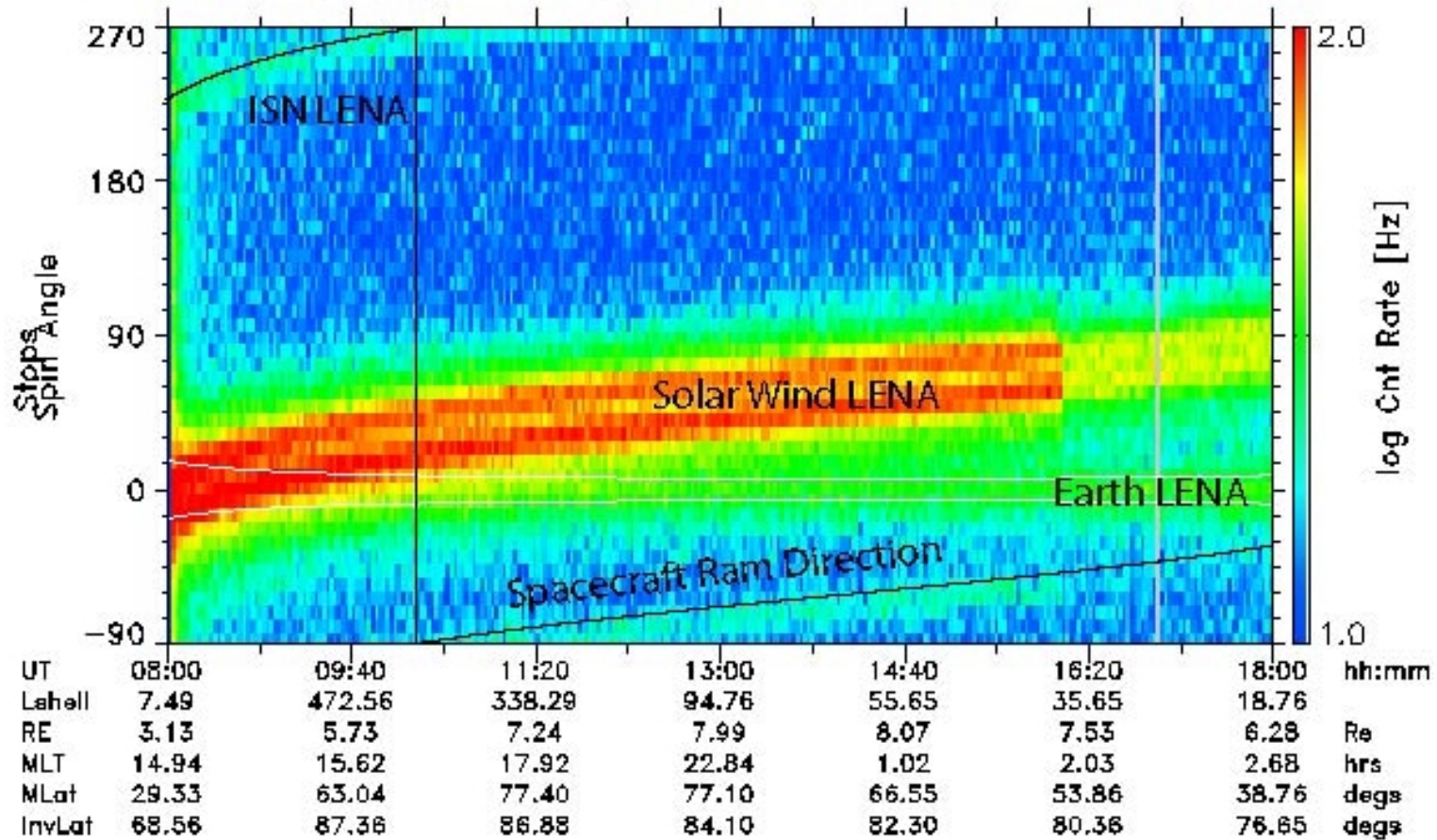
IMAGE/LENA Stop Singles: Hydrogen-1 Prediction; $\mu=0.8$; $v_0=20$ km/s

Start Time: 2001/01/25 (25) 08:00:00

Stop Time: 2001/01/25 (25) 18:00:00

no data

no cnts



TOF Start CFD Level: 11
 HVPS Optics Steering Cmd: 0*
 lena_dps_v1.0.0
 Wed May 23 12:09:10 2001
 Data: UDF Definitive
 zero spin angle: Earth

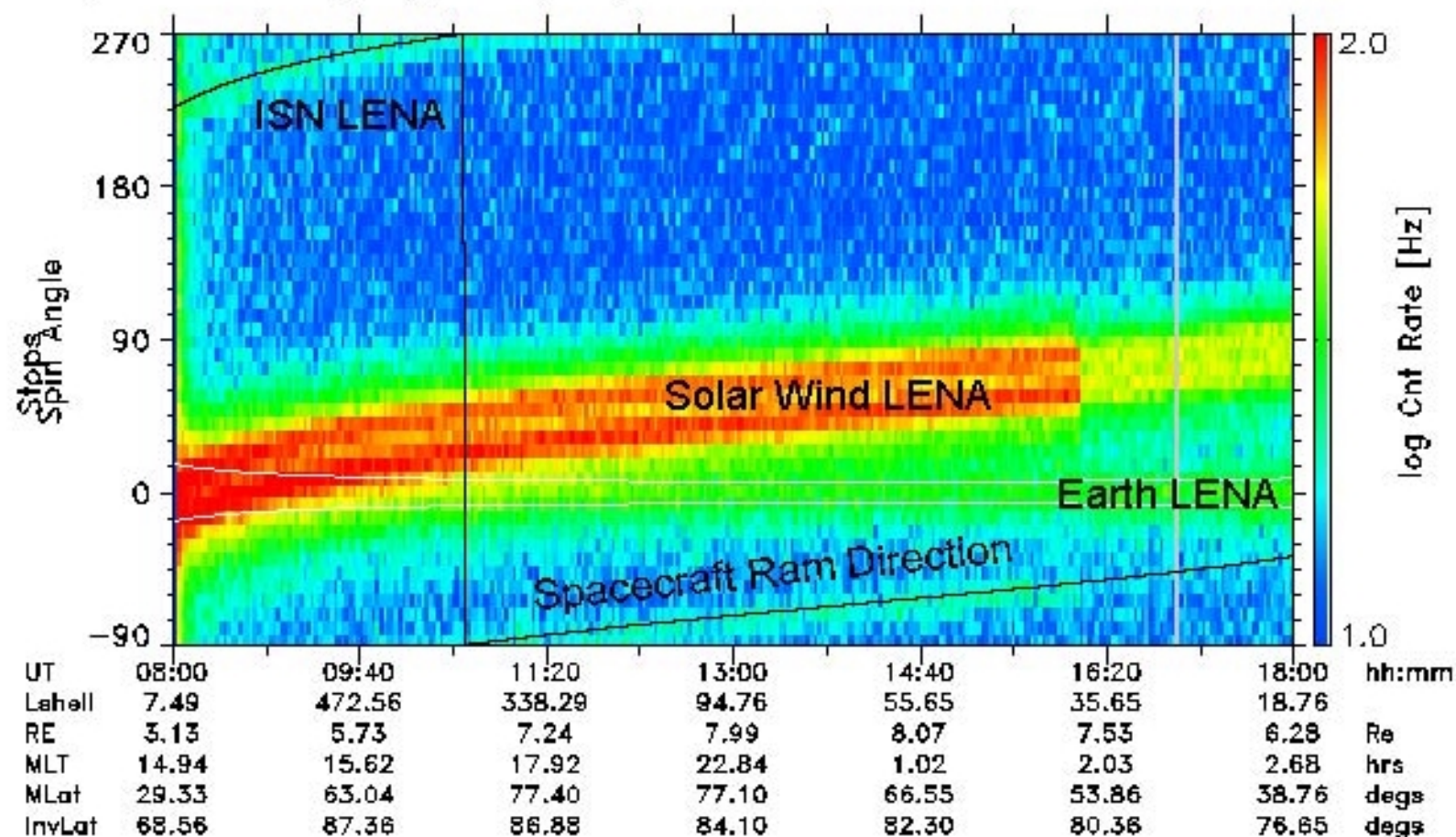
TOF Stop CFD Level: 6
 HVPS MCP Stop VMON: 167
 /space/www/stage/101012508001800_sumsp0_q5066.glf

IMAGE/LENA Stop Singles: Helium-4 Prediction; $\mu=0.0$; $v_a=26$ km/s

Start Time: 2001/01/25 (25) 08:00:00

Stop Time: 2001/01/25 (25) 18:00:00

no data
no cnts



TOF Start CFD Level: 11
HVPS Optics Steering Cmd: 0*

TOF Stop CFD Level: 6
HVPS MCP Stop VMON: 167

lena_dps_v1.0.0

/space/www/stage/101012508001800_sumsp0_q5066.gif

Wed May 23 12:09:10 2001

Data: UDF Definitive

zero spin angle: Earth

Summary and Conclusions

- Orbits of interstellar neutral atoms have been calculated in three dimensions
- Corrections have been made for the velocity of the Earth wrt the Sun, velocity of the spacecraft wrt the Earth, solar gravitation and deflection, and radiation pressure
- Results are consistent with earlier results of Fuselier, Bzowski
- Location of signal in LENA spectrograms in Jan.-Feb. 2001 is consistent with the expected direction of interstellar neutral atoms
- Preliminary results suggest that the observed signal is most consistent with helium-4